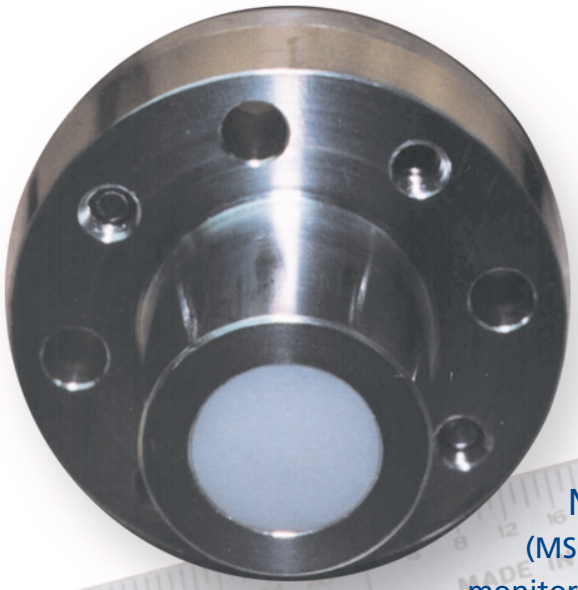
Low-Cost, Passive Light Exposure Monitor

NASA offers companies a handheld device for accurate light exposure readings.



NASA Marshall Space Flight Center (MSFC) has produced a passive light exposure monitor that is small, reusable, highly accurate, and tunable for exposure and wavelength—all at a price that makes it a disposable item.

Benefits

MSFC's passive light exposure monitor represents a breakthrough for users of large and expensive light exposure equipment. This invention is:

- ***Handheld***—Is smaller than current light exposure equipment
- ***Passive***—Requires no batteries, power supply, or communication link
- ***Inexpensive***—Costs only $15 in small prototype quantities
- ***Accurate***—Compared favorably to expensive meters in NASA's space experiments
- ***Flexible***—Can be engineered for various wavelengths and exposure times
- ***Reusable***—Can be reset with accompanying equipment

Commercial Applications

MSFC's passive light exposure monitor can be designed for specific wavelengths of light and for varying amounts of total exposure. This flexibility, along with the low cost, makes a variety of applications possible. The device can be used to monitor:

- Sun exposure tests for consumer products, materials, and chemicals
- Material tests in space
- Ultraviolet (UV) applications, including curing processes, electronics data erasing
- Light output over time from solar simulators
- Sunlight over a large area

Versions also can be easily configured for:

- Month- or year-long sun exposure readings for climate studies
- UV-only monitoring for studying ozone layer depletion

National Aeronautics and Space Administration

The Technology

NASA Marshall Space Flight Center's passive light exposure monitor (PLEM) offers dramatic improvements in cost and size over existing equipment. The PLEM requires no batteries, external power source, or communications link to operate, and it can accurately measure total light exposure over a wide range of wavelengths and exposure magnitudes. A small visual indicator, intended only for rough resolution exposure readings, shows the amount of total light exposure that has occurred.

To derive a more resolved and accurate reading of total light exposure, users can post-process the device with a standard companion tool of moderate cost. The exposure reading then is as accurate as larger, more expensive exposure monitors. The post-processing operation also resets the device for reuse, if reuse is desired.

As an alternative to reusing the PLEM, its low cost (less than $15 for prototypes) allows it to be simply discarded. For example, atmospheric scientists could scatter hundreds of PLEMs over a remote region and return months later to take readings. They could forgo the burden of carrying the devices out on foot—an option not feasible for users of expensive light monitoring equipment. Alternatively, the scientists could elect to tour the remote area with the post-processing tool to gather more accurate readings and leave the reset PLEMs behind for future readings.

Four prototypes of the PLEM were tested on NASA's Passive Optical Sample Assembly experiments (POSA I and POSA II). Light exposure monitors were used in testing new Space Station materials for the degrading effects of solar exposure in space. Post-processed PLEM readings were compared to readings from the highly accurate exposure monitors. It was determined that total integrated light exposure had been accurately recorded by MSFC's low-cost, passive devices.

Partnering Opportunities

This technology is part of NASA's technology transfer program. The program seeks to stimulate development of commercial uses of NASA-developed technology. Companies are invited to explore various partnering options, including licensing and joint development. NASA is flexible in its agreements, and opportunities exist for patent licenses that are exclusive, nonexclusive, or exclusive in a defined field of use.

For More Information

If you would like more information about this technology or about NASA's technology transfer program, please contact:

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More information about working with MSFC's Technology Transfer Department is available online.

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